

was just about to hop into it when it caught sight of the caterpillar, and stood jerking its head from side to side, but did not venture to enter. Another bird soon came, and behaved in a precisely similar manner; then a third, and a fourth; others settled on the perch over the trough, and a flock of ten or twelve were finally perched around. They all stretched their heads and looked into the trough, but none flew into it."

On removing the caterpillar the birds again assembled, and at once entered the trough to feed. Fowls were also frightened at first, and would draw back just as they were going to peck at the caterpillar. At last, after several had tried, and even made ineffectual attempts to peck, one more courageous than the rest would actually touch it, and after a time, finding nothing disagreeable, the insect would be swallowed. In the genus *Deilephila*, however, there are uneatable caterpillars, and these have strongly contrasted black and white or yellow spots combined with the habit of fully exposing themselves upon their food plants. Dr. Weismann experimented with two species (*D. galii* and *D. euphorbiae*) and found that they were refused by birds, though the latter was eaten by lizards. It is to be noted however that the experiments were made with a South European species of lizard, not that of Germany, so that the result has not a direct bearing on the point.

The general conclusion at which Dr. Weismann arrives is, that all the varieties of colour and marking occurring in the Sphingidae have a distinct biological value, and can in every case be traced to the action of natural selection and correlation of growth.

The next essay is not quite so interesting or important. It is an endeavour to prove, by a distinct line of inquiry, that the markings of the larvæ are not due to a "phyletic vital force" or to general laws of growth and development. The different groups of Sphingidae are minutely examined and compared in their three stages of larva, pupa, and imago, and it is shown that the changes that occur from species to species in each stage are to a great extent independent of the changes in the other stages. Numerous examples of this want of phyletic parallelism are given, and it is hence argued that the modifications which occur must be due to an adaptation to the special conditions to which the insect is exposed in one or other of its states, not to any innate law of variation and development, which, it is argued, would affect all the stages *pari passu* and produce a "phyletic parallelism" which does not actually exist. The same general facts are shown to prevail, not only among Lepidoptera generally, but among all insects and crustacea—or generally among all organisms which undergo a metamorphosis.

This instalment of the work has been admirably translated and edited by Mr. Meldola, who, in a series of valuable notes and an Appendix, has brought up the information on every branch of the inquiry to the latest date. The six coloured plates of larvæ in their several stages are very well executed, and serve to illustrate the somewhat complex discussion in a clear and effective manner.

ALFRED R. WALLACE

OUR BOOK SHELF

The Wandering Jew. By Moncure Daniel Conway.
(London : Chatto and Windus, 1881.)

THIS last volume of Mr. Conway's is a study, not only of the legend of the Wandering Jew, but with it of the large

group of analogous myths of undying men who from age to age wander over the earth, or sleep in caverns, or are translated from among men into divine regions, whence however they come back and show themselves still living men. The interest of these stories in the history of philosophy lies in their keeping up men's early ideas of life and death. One of Mr. Conway's purposes in discussing them is to draw attention to their being relics of the primitive period when men were still so far from definitely realising the nature of death, that they had no difficulty in regarding kings, heroes, and prophets as having only departed for a while from among them, to return in a future age to rule and protect their expectant nations. In comparative mythology this group of stories has some importance. They show the beliefs of various races running curiously into one another, as where the Lancashire peasant still hears in the cry of the plover the wail of the Wandering Jew, or in the Harz Mountains his myth has got mixed with that of a grander wanderer, the Wild Huntsman, who courses with his storm-clouds across the sky. The storm-demon whom mythic fancy imagines rushing through the air is often called a *Macabee*, and Mr. Conway points out why he has this name. It is because of a verse in the Second Book of Macabees, chap. v., which, by the way, is a good instance of the personal forms taken by the fancy of an excited people: "And then it happened, that through all the city, for the space almost of forty days, there were seen horsemen running in the air, in cloth of gold, and armed with lances, like a band of soldiers." Unfortunately some other etymologies made or quoted by Mr. Conway are not so reasonable as this. When the names of biblical personages, *Herod* and *Ahasuerus*, find their way into European myths, it may not be easy to explain how they got there, but at any rate it is better to leave them alone than to make up imaginary and even impossible German or Scandinavian forms, *Haar-Rote*, *As-Vidar*, to account for their presence. It would be easy to take exception to many of the arguments in this volume, but at any rate there are many interesting points in it.

A Short Sketch of the Geology of Yorkshire. By Charles Bird, B.A. (Univ. Lond.) (London : Simpkin, Marshall, and Co.; Bradford : Thomas Brear, 1881; pp. 187 and Map.)

Geological Map of Yorkshire. By the same Author. (Edinburgh and London : W. and A. K. Johnston; Bradford : T. Brear, 1881.)

IN the preface of this book, written by way of dedication, it is represented to be a "small and cheap volume suitable to the 'general reader' and tourist." It is impossible to say that it is not a useful and interesting one. So much good work has been done on the county, though scattered through very various publications, that a short *résumé* cannot fail to be of value; but there are books and books, and if we measure this by what it might have been, it is poor indeed. It resembles, in fact, geologically speaking, a kind of boulder clay, full of fragments of solid rock, brought from a distance—we will not say to be deposited in mud—but certainly scratched and rubbed in the process. In the beginning of the volume is a list of the surrounding mountains whence the boulders have been derived, but it is not a complete one; and the source of each fragment is not indicated in the body of the text. Its great defect is that it is unstratified; in other words, the extracts are not duly digested, but thrown together without sorting, and with very little alteration; so little indeed that it would not be difficult to trace them to their sources. Thus under the head of "The Carboniferous Period" we have a brief explanation, from a popular lecture, "how from the general mineral character of a rock the circumstances under which it was formed can often be predicated." Then under the head of "Salt water deposits" we have twelve pages on the origin and contents of the Victoria

Cave, which ought surely to belong to the chapter on the "Recent Geological History of Yorkshire," only that the latter happened to be written by one who confined himself to the Holderness drift. Under the head of "The Permian Rocks" there is an exposition of the views of those who would reintroduce the old (not recently suggested) name Poikilitic to include the Trias. It was a pity the author was not acquainted with any recent papers on the series above the Lias, for there are no good boulders in this part of the book. Mr. Hudleston's admirable papers on the Yorkshire Oolites seem to have been written in vain, and there have been modern papers also on the Yorkshire Chalk. It was perhaps excusable for our author to conclude that the third edition of Prof. Phillips' "Yorkshire Coast" contained all the most recent information, though every East-Yorkshire geologist knew that it did not. In examining a work on local geology it is always well to see where the author lived, for the surrounding country will be the best described. So it is here; the best part of the book is the description of the Middle and Upper Coal-measures, which are well developed in the neighbourhood of Bradford. For East Yorkshire and the coast the book is of little value.

The topography of the map requires no other guarantee than the name of the constructors for its excellency. The south-western part of the geological colouring derived from the Geological Survey maps is also very good. Nor can we complain when lack of published material prevents accuracy elsewhere, though it is a reason for regretting the slow publication of the Geological Survey maps which have been long ago completed; but when the whole of the Vale of Pickering is coloured Neocomian, and a patch of the same is placed in the south near Cave, scarcely an acre of rocks of that age being discoverable in the former, and none in the latter locality, one is led still more to regret that the author's map should be spoiled by his not knowing Mr. Hudleston's papers and relying on Prof. Phillips. But he has surely introduced a little mistake of his own, which will be very serious to visitors to the popular watering-places of Scarborough and Filey. The Castle Rock and Filey Brig are coloured—one Lower Oolite and the other Neocomian, whereas they are both what the author would call "Middle Oolite"! It will take more than Mr. Bird to write a good "Geology of Yorkshire."

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*]

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

Leaves Injured at Night by Free Radiation

FRITZ MÜLLER, in a letter to me from Sta. Catharina in Brazil, dated August 9, supports the view which I have advanced with respect to leaves placing themselves in a vertical position at night, during their so-called sleep, in order to escape being chilled and injured by radiation into the open sky. He says: "We have had last week some rather cold nights (2° to 3° C. at sunrise), and these have given me a new confirmation of your view on the meaning of the nyctitropic movements of plants. Near my house there are some Pandanus trees, about a dozen years old; the youngest terminal leaves stand upright, whereas the older ones are bent down so as to expose their upper surfaces to the sky. These young leaves, though of course the most tender, are still as fresh and green as before; on the contrary, the older ones have suffered from the cold, and have become quite yellowish. Again, the leaves of *Oxalis sepium* were observed

by me to sleep in a very imperfect manner during the summer, even after the most sunny days; but now, in winter, every leaflet hangs down in a perpendicular position during the whole night." It is a new fact to me that leaves should sleep in a more or less perfect manner at different seasons of the year.

CHARLES DARWIN

Red Rainbows

THE account in NATURE, vol. xxiv. p. 431, of a pink rainbow seen from Mr. Tennyson's house, recalls to me a rainbow which I witnessed in July 1877 over the Lake of Lucerne from the promenade in front of the Schweizerhof. The bow in question appeared at sunset, when the whole sky, east and west, was lit up with ruddy tints; and just before it faded out, the bow itself, which was a very brilliant one, showed only red and orange colours in place of its usual array of hues. No fewer than five supernumerary arcs were visible at the inner edge of the primary bow, and these showed red only. I fancy that the phenomenon cannot be very rare, from the circumstance that in pictures of the rainbow red and yellow are frequently the only colours set down by the artist. A few months ago Mr. C. Brooke Branwhite of Clifton showed me a very beautiful sketch in oils by his father, the late Mr. Charles Branwhite, a colourist of no mean power, in which a beautiful and exquisitely pellucid rainbow was drawn with red and yellow tints only. It may also be mentioned that in the copy of Rafael's "Madonna di Foligno" in the Dresden Gallery, there is a semi-circular red and yellow rainbow. I have not seen the original Foligno Madonna in Rome; and should be interested to know whether in this also red and yellow are the only tints accorded by the colourist.

Haslemere House, Clifton SILVANUS P. THOMPSON

IN your issue of the 8th inst. (vol. xxiv. p. 431) your correspondent "A. M." describes what he calls a "pink rainbow" seen by him at Aldworth, near Haslemere, and as a painter I am interested in his description, as it exactly corresponds with the same phenomenon as seen by me here, same date, and viewed with curiosity by myself and friends.

Corrie Hotel, Arran, September 11 DAVID MURRAY

Atoms

ALTHOUGH I am not an "eminent" authority, perhaps you will excuse my troubling you with the following extract from a paper read by me before the Philosophical Society of Glasgow in November, 1875, a copy of which paper I posted to the Editor of NATURE:—"I have long been of opinion that the most probable hypothesis of the origin of atoms is that there is only one kind of matter—ether or its constituents—and that atoms are merely congregations of units of ether circling at enormous speeds round each other, differently grouped, in different numbers, at different velocities, and at different distances, even as the different members of our sun systems. . . . The numbers of units in each similar atom need not be always the same; a few dozens more or less will not be appreciable by us. On the other hand, if a so-called element show a plurality of spectroscopic lines or hues, I do not think it at all doubtful that there is a plurality of units moving to produce these, since they thus show effects of different modes of moving of bodies; all our different states of sensual consciousness of colours are necessarily dependent on differences in the modes of moving of the agents that excite in us such plurality of lines and hues. As the motions of atom, or rather of groups of atoms, excite in us sensations of sound, so the motions of units, or rather of groups of units, excite in us sensations of colour, and of course the lower-pitched movements of dark heat. Then again, we may hold that the more lines that persist in a spark or a sun, the less easily reducible are the portions of the elements showing them, as far as these lines' constituents are concerned—the lines being still undissociated material." (Proc. Phil. Soc. of Glas., vol. x. p. 61.)

HENRY MUIRHEAD

Cambuslang, August 26

Luminous Phenomena on Rupture of Sea-Ice

IN my diary for January 20, 1881, occurs the following passage. I make no attempt to account for the phenomenon, but am certain it was not caused by any reflection of the lights on board the vessel:—